

# Establishing Riparian Buffers in Suburban Areas



PHILADELPHIA  
PARKS & RECREATION



PHS

# TreeVitalize Watersheds

- Partnership with DEP, DCNR, PHS, and Aqua PA
- Focused on increasing canopy cover in riparian areas and floodplains
- 122,973 trees and 14,007 shrubs planted since 2004
- 787 acres planted since 2004

# Heritage Conservancy Study

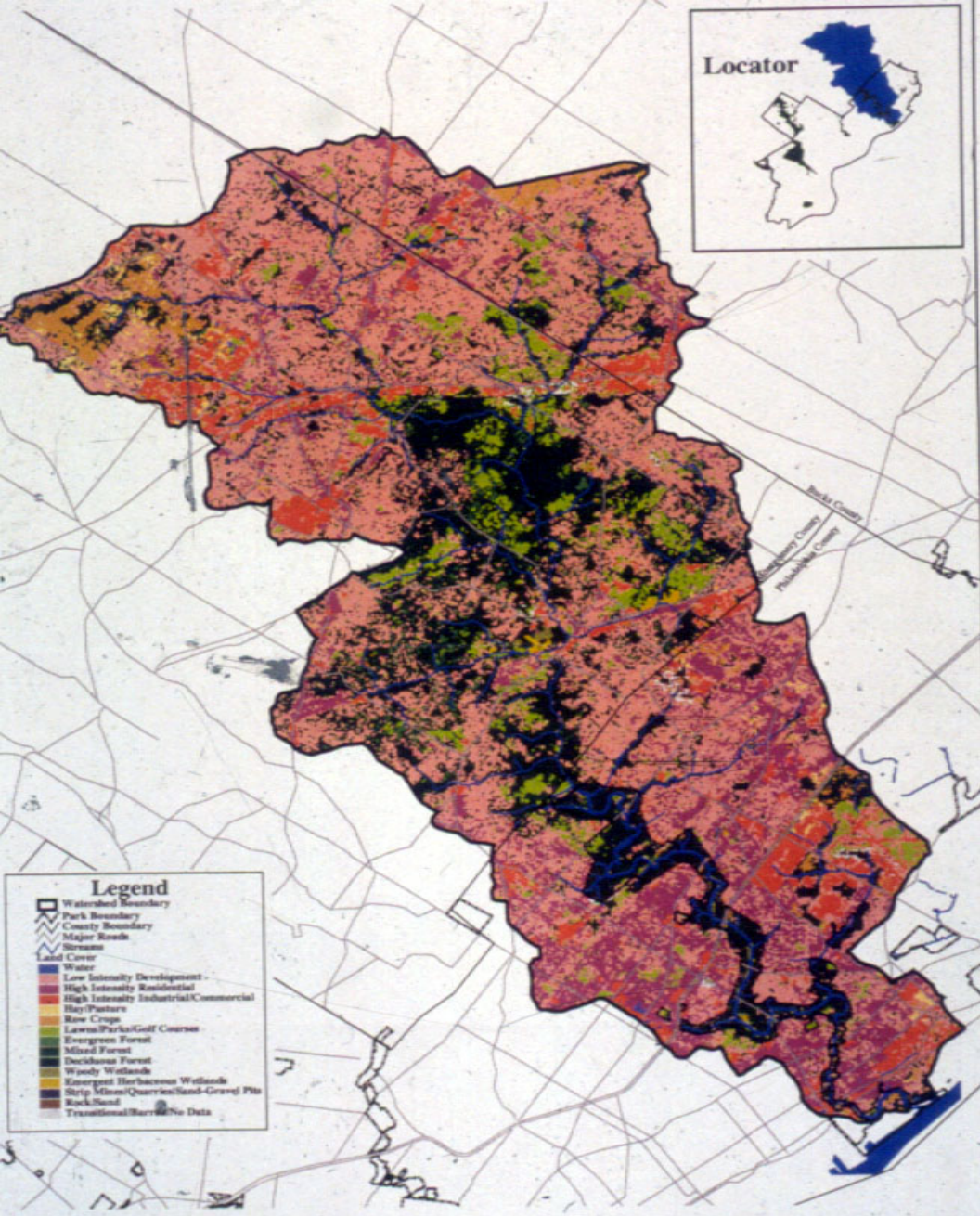
2001 assessment of riparian buffer on 940 miles of stream length in southeast PA  
23-31% of the length of streams running through Philadelphia lacked forest buffer on at least one side (216-291 mi; includes stream length outside Philadelphia)  
Philadelphia park examples: mown lawns, golf courses

# Benefits of forested riparian areas

- Protect water quality
  - Remove pollutants from runoff and subsurface flows - sediment, attached N and P, pesticides
  - Stabilize banks and floodplain
- Improve aquatic habitat
  - Shade/cool streams
  - Provide food (detritus, insects) for aquatic organisms
- Provide terrestrial wildlife habitat
  - Food, cover, breeding and nesting sites
- Aesthetic interest

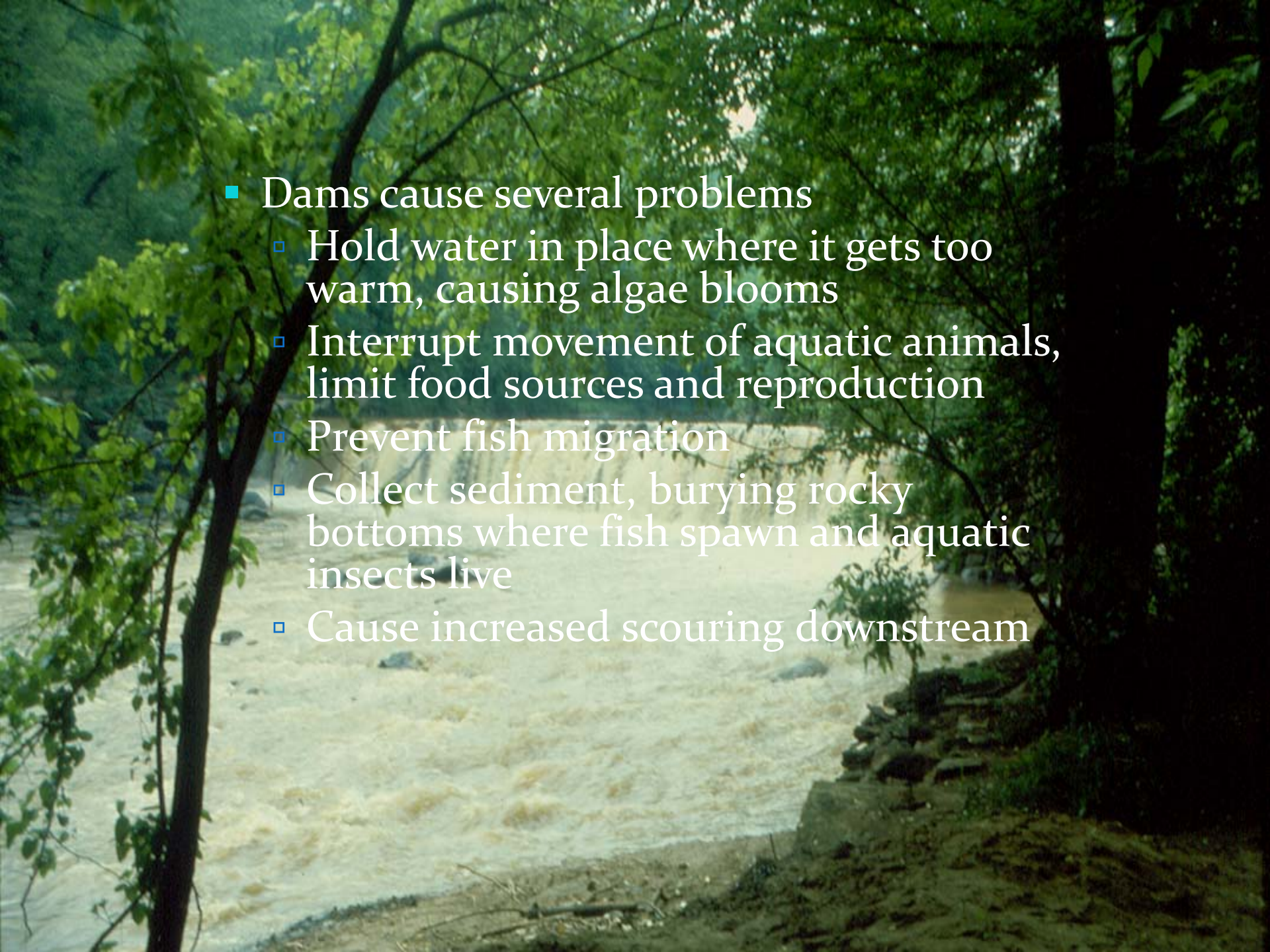


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Impervious surface-  
everything in red  
More than 13%  
= Impaired

- Legend**
- Watershed Boundary
  - Park Boundary
  - County Boundary
  - Major Roads
  - Streams
  - Land Cover
    - Water
    - Low Intensity Development
    - High Intensity Residential
    - High Intensity Industrial/Commercial
    - Hay/Pasture
    - Row Crops
    - Lawns/Parks/Golf Courses
    - Emergent Forest
    - Mixed Forest
    - Deciduous Forest
    - Wetland
    - Emergent Herbaceous Wetlands
    - Strip Mine/Quarries/Sand-Gravel Pits
    - Rock/Soil
    - Traditional/Barren/No Data

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- A photograph of a river with a dam in the background, framed by trees in the foreground. The water is turbulent and white with foam, indicating a high flow rate. The dam is a long, low structure with a spillway. The surrounding area is lush with green trees and foliage.
- Dams cause several problems
    - Hold water in place where it gets too warm, causing algae blooms
    - Interrupt movement of aquatic animals, limit food sources and reproduction
    - Prevent fish migration
    - Collect sediment, burying rocky bottoms where fish spawn and aquatic insects live
    - Cause increased scouring downstream

# Site prep – pre-planting

- Good candidates
  - (unnecessarily) mown areas
  - golf courses
  - existing degraded or sparse riparian areas
- Avoid problematic areas
  - Future infrastructure maintenance, stream restoration or dam removal
  - Excessive scour or flood deposition
- Remove invasives
- Control invasives

# Knotweed response - Tacony Creek

- Knotweed was sprayed twice in one season
- Control was inadequate and knotweed re-colonized the site



After planting. Site was sprayed.



One year after planting.



# Planting Criteria

- Plant only if:
  - invasive plants have been removed *and controlled*
  - deer browse is minimal or deer protection is used
  - regular follow up maintenance can be done
  - watering is possible
- Plant in optimum seasons
  - late March to mid May
  - late September to mid-November

# Typical pre-restoration conditions

- Low diversity of natives in all but canopy layer
- Low density or no natives in herb and shrub layers
- Lack of recruitment of canopy trees
- Heavy deer browse
- Alkaline soils
- Potential flooding

# Planting goals

- Protect water quality
- Improve aquatic habitat
- Facilitate development of healthy, diverse plant communities
- Enhance native plant density and diversity
- Create a variety of food, cover, breeding and nesting areas for local animals (land and water)



# Plant selection criteria

- Only species native to region
- Species found on floodplains in the Piedmont and/or Coastal Plain (depending on planting location)
- Site factors: soil moisture, shading, existing vegetation
- Include species typically found in a healthy system - e.g., sycamore, river birch, silky dogwood, arrowwood



# Plant selection criteria

- Avoid very common species that self colonize - e.g., box elder, red maple
- Plant for multiple strata, primarily trees and shrubs to date – herbs often difficult (invasives, deer, heavy flows), but seed disturbed sites
- Include species that cater to wildlife – e.g., oaks, fruit bearing shrubs
- Use larger container plants (e.g., #5, #7)
- Availability? (e.g., strawberrybush)

# Post-planting Maintenance & Monitoring

- Site maintenance
  - Invasive control
    - Cutting, backpack sprayer
    - First 3 yrs critical. Plan on 10. Needs diminish over time
  - Staking
  - Debris removal
  - Watering
- Site monitoring – what worked, what didn't?

# Working in a Suburban Watershed

- Similar to urban watersheds
- High stormwater volume and speed
- More nutrient
- Incised streambeds
- Lowered shallow water table
- Don't forget the neighbors!



# Natural Stream Channel Design

- Multivariate analysis of stream channel
  - Drop in grade
  - Sinuosity
  - Substrate
  - Soils
  - Etc.
- Analysis provides specifications for:
  - structures
  - channel shape and course
  - planting methods





# NSCD Water Quality Benefits

- EPA estimates per 100 ft of NSCD work removes:
  - 75 lbs of nitrogen
  - 68 lbs of phosphorous
  - 248 lbs of total suspended solids
  - PER YEAR





3:1 GRADE STREAMBANK SLOPE WITH  
VEGETATION PLANTINGS

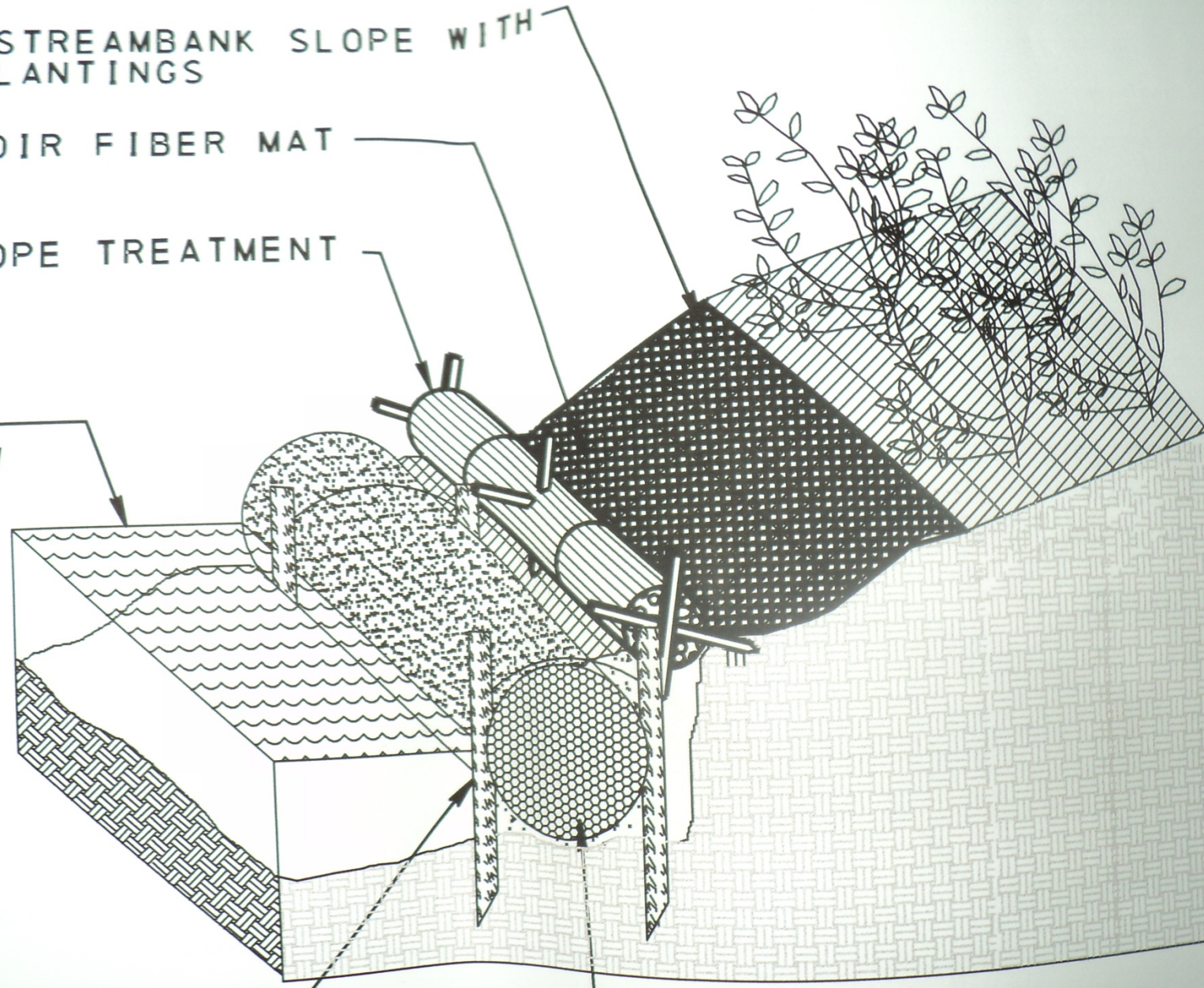
COIR FIBER MAT

FASCINE SLOPE TREATMENT

NORMAL  
BASEFLOW  
LEVEL

STAKES MIN. 3' LENGTH  
FOR TWINE, SPACED 4' O.C.

12" NATURAL  
FIBER LOG ROLLS







# Sandy Run Wetland



# The work begins



# Final grade





A year later



# Dam removal

## Benefits

- Reduced sedimentation
- Increased dissolved oxygen
- Improved aquatic habitat
- Increased food sources for aquatic animals
- Increased connectivity for fish movement
- Possible reintroduction of migratory fish

# Plymouth Road Dam Wissahickon Creek



Going...



Gone!



# The next day

